

Algebra 2
Review - Logs

Name: _____
Date: _____ Period: _____

Write each of the following in logarithmic form:

1) $3^4 = 81$

$\log_3 81 = 4$

2) $64^{\frac{1}{3}} = 4$

$\log_4 64 = \frac{1}{3}$

3) $7^{-2} = \frac{1}{49}$

$\log_7 \frac{1}{49} = -2$

Write each in exponential form:

4) $\log_6 \left(\frac{1}{36} \right) = -2$

$6^{-2} = \frac{1}{36}$

5) $\log_x 7 = y$

$x^y = 7$

6) $\log_y x = -4$

$y^{-4} = x$

Write each expression as a single logarithm:

7) $\log_2 12 + \log_2 5$

$\log_2 12 \cdot 5$

$\log_2 60$

8) $\log_3 16 - \log_3 5$

$\log_3 \frac{16}{5}$

9) $\log_5 6 + \log_5 4 - \log_5 3$

$\log_5 24 - \log_5 3$
 $\log_5 \frac{24}{3}$

$\log_5 8$

10) $2\log_7 x + \log_7 5$
 $\log_7 x^2 + \log_7 5$

$\log_7 5x^2$

11) $6\log_4 x - 2\log_4 y$
 $\log_4 x^6 - \log_4 y^2$

$\log_4 \frac{x^6}{y^2}$

12) $\frac{1}{2}\log_b 25 + 3\log_b z$
 $\log_b 25^{\frac{1}{2}} + \log_b z^3$
 $\log_b 5 + \log_b z^3$

$\log_b 5z^3$

Solve each equation for x. No decimal answers. Be sure to check for extraneous solutions.

13) $\log_5 x = 3$

$$5^3 = x$$

$$x = \underline{125}$$

14) $\log_2 16 = x$

$$2^x = 16$$

$$x = \underline{4}$$

15) $\log_4 (5x - 6) = 3$

$$4^3 = 5x - 6$$

$$64 = 5x - 6$$

$$70 = 5x$$

$$x = \underline{14}$$

16) $\log(4x - 5) = \log(2x - 1)$

$$4x - 5 = 2x - 1$$

$$2x = 4$$

$$x = \underline{2}$$

17) $\log_7 4 + \log_7 (x + 3) = 2\log_7 5$

$$\log_7 4x + 12 = \log_7 25$$

$$4x + 12 = 25$$

$$4x = 13$$

$$x = \underline{\frac{13}{4}}$$

18) $\log_2 x + \log_2 (x - 4) = 5$

$$\log_2 x^2 - 4x = 5$$

$$x^2 - 4x = 32$$

$$x^2 - 4x - 32$$

$$(x - 8)(x + 4) = 0$$

$$x = \underline{8, -4}$$

19) $3\log_2 4 + 4\log_2 3 - 2\log_2 6 = 2\log_2 x$

$$\log_2 4^3 + \log_2 3^4 - \log_2 6^2 = \log_2 x^2$$

$$\log_2 64 + \log_2 81 - \log_2 36 = \log_2 x^2$$

$$\log_2 144 = \log_2 x^2$$

$$x^2 - 144 = 0$$

$$(x - 12)(x + 12) = 0$$

$$x = \underline{12, -12}$$

20) $\log_4 (x + 1) + \log_4 (x - 2) = \log_4 (x^2 - 9)$

$$\log_4 x^2 - x - 2 = \log_4 (x^2 - 9)$$

$$x^2 - x - 2 = x^2 - 9$$

$$-x - 2 = -9$$

$$-x = -7$$

$$x = \underline{7}$$